

1 **TITLE OF THE INVENTION :**

2 **CARTRIDGE BASED SMALL ITEM RESTRICTED ACCESS DISPENSER SYSTEM**

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4 **FIELD OF THE INVENTION**

5 This application pertains to a restricted access small item dispensing system, which  
6 may be accessed by coin receiver, bill insertion system, credit card reader, voice recognition  
7 system, keypad or other secure mode in order to address a specific cartridge within a module.  
8 This application discloses and claims subject matter disclosed in my earlier filed provisional  
9 application, Serial Number 60/256,262 filed December 19, 2000 .

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11 **BACKGROUND OF THE INVENTION**

12 The need for a secure dispensing system for small items such as keys, to permit access  
13 to car pool vehicles, access to city owned bicycles for use in crowded city centers, access to  
14 self service medicine chests for ambulatory patients at hospitals and other facilities; short  
15 messages for tenants in multi-occupant suites, the storage of tokens for use by patrons in coin  
16 operated machines such as copiers in public buildings such as libraries and country clerk  
17 offices; and the ability to access other small items for specific users has been well  
18 documented. This invention fills that need by providing a secure dispensing system that can  
19 be accessed by a plurality of means, such as but not limited to a 10-key keypad; a coin or bill  
20 insertion system, a credit card reader, off-site telephone keypad such as on a cell phone, or  
21 other secure access means such as fingerprint or voice recognition or eye discernment means.  
22 Access may be limited to a single individual, or a class of persons depending upon the access  
23 code or access mode to be utilized to gain entrance to a cartridge.

24 The invention herein consists of a series of individually accessible cartridges placed  
25 within a module. Here five [5] cartridges are utilized but this is not a limiting number. Each  
26 module of five cartridges is disposed within a box that holds a plurality of modules and a  
27 plurality of boxes can be housed in a cabinet. The storage area of each cartridge is designated  
28 the chamber.

29 The invention accordingly comprises the device possessing the features properties and  
30 the relation of components which are exemplified in the following detailed disclosure and the  
31 scope of the application of which will be indicated in the appended claims. For a fuller  
32 understanding of the nature and objects of the invention reference should be made to the  
33 following detailed description, taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE FIGURES

FIGURE 1 is a front perspective of a single box with a multiplicity of cartridges within their respective cartridge housings.

FIGURE 2 is a perspective view of a storage cabinet housing a series of boxes of a plurality of modules forming a part of this invention.

FIGURE 3 is a front perspective view of one module of this invention.

FIGURE 4 is a rear to perspective view of one module of this invention.

FIGURE 5 is a front elevational closeup view of one partially filled module of this invention.

FIGURE 6 is a bottom perspective view of the module of this invention.

FIGURE 7 is a top perspective view of a pair of cartridges according to this invention, wherein the left one adjacent the pen shown for size only and not related to the invention, is a rear perspective view, and the cartridge distant from the pen is a front perspective view.

FIGURE 8 is a side perspective view of an individual cartridge employed with this invention.

FIGURE 9 is a side sectional view through a module of this invention illustrating an individual cartridge and its release mechanism's components.

FIGURE 10 is a diagrammatic view of the procedure to use the system of this invention to access stored small parts.

FIGURE 11 is a diagrammatic view illustrating a plurality of ways of accessing the storage cabinet that holds a plurality of the modules of this invention.

FIGURE 12 is an electrical schematic diagram of the circuitry involved for the operation of the access system of this invention.

## SUMMARY OF THE INVENTION

There is provided a secure access small item dispensing system that employs a plurality of cartridges each of which cartridges is capable of holding a small item to which access is to be limited to one person or a class of persons all of whom possess the access code or access mode, to cause the dispenser to release the cartridge from its holder for access to the contents. The apparatus comprising a storage cabinet having a plurality of boxes laid out in rows or columns, each of which boxes has a plurality of modules, each of which modules holds a plurality of cartridges therein.

The system uses any of several electronic signal inputs to actuate a release mechanism to cause the cartridge to be ejected from its module for access to the contents. Upon entry of the access code -E.G.- specific numbers on a keypad, or by use of the access mode, E.G. coin or bill insertion operation, an energized solenoid releases a latch that retains the cartridge in position within its housing in the module and a leaf spring urges it forward to be grabbed manually by the intended accessor. Upon insertion of the cartridge, or when returned into the slot, the physical force of urging the cartridge rearwardly, causes the cartridge to override a pawl of the latch pushing the pawl section downwardly, and a second leaf spring raises the pawl to its at rest position thus re-engaging the cartridge.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

A brief moment will be spent on the recital of the various aspects of this dispenser system for small parts. The invention herein consists at the lowest level of a series of individually accessible cartridges, of either plastic or metal, all of which are placed within a module. The number of cartridges may be arbitrarily chosen, but for illustrative purposes, five [5] cartridges per module are depicted, but this is not a limiting number. A series of cartridge loaded modules is disposed within a box that holds a plurality of modules these boxes may be oriented vertically or horizontally. A plurality of boxes can be housed in a cabinet. The storage area of the module that holds a single cartridge is designated as a cartridge receiver slot, and the storage area of an individual cartridge is designated the chamber.

In FIGURE 1 there is shown a conventional 6-sided box 100 having as the front surface a faceplate 101, and having a top surface 103. This faceplate 101 is attached to the sidewalls through threaded aperture 102 which receives screws 192S. These screws can be of the one way drive variety to impede vandalism. Top wall 103 has a series of spaced threaded apertures 109 for receipt of screws 109S, which screws matingly engage apertures not seen on the individual module to retain the module in the box 100. Seen exiting the rear wall (not seen) is a line cord 106 with a suitable connector 107 thereon for attachment to a common source of power for all of the modules. Construction of the box 100 is deemed conventional and can be of any tamper resistant material such as hardwood, metal or plastics such as polycarbonate. A cartridge specific identification means 56, discussed elsewhere, is seen in part.

In FIGURE 2, is a perspective view, partially in cutaway at side opening 124 to illustrate the attachment of one box 100 to the sidewall 131 of cabinet 120 by flange plate 104. Other boxes 100 would be retained in the cabinet in like manner.

Designator 128 is an alphanumeric indicator for the identification of each separate cartridge in a module. By having such indicator system 56 have a light capability, storage in-use condition can be readily seen by users of the system. Identification means 56 is electrically connected to access point 125.

As mentioned earlier, access to the system of this invention 200 can be had by an actuating means set in motion by an access code or access mode. One example of an access code input device would be by the use of voice recognition software to a computer not seen, stored either in the cabinet or offsite and linked electronically to the cabinet 200. Another access code would be by remote land line or cellular telephone to the same computer. Access

1 mode examples are seen implemented into access point 125, an electronic device coupled to  
2 the cabinet 200, having several sources of monetary input which include a coin slot 121, a  
3 credit card or debit card or other card, card reader 130 and a paper money receiver 129, said  
4 electronic device being electrically connected to the plurality of modules and each individual  
5 cartridge therein. Any of these can be used to access any cartridge similar to the accessing of  
6 a candy bar or cookies from a vending machine, wherein the software programming permits  
7 access to the next full cartridge. Or in the alternative the money insert sources can be tied to  
8 the 10-key keypad 126 such that once money is credited, access can be had to a specific  
9 cartridge as opposed to a random cartridge. As a third alternative, the keypad could be used  
10 alone, with resort to money input. All of these modes of gaining access to a cartridge, be it  
11 specific or arbitrary are deemed to be within the skill of the art.

12 \*\*\*\*\*

13 In FIGURE 3, the front of an individual module 10 is seen. This module 10 has a  
14 housing 12 with a top wall 11, a spaced bottom wall 13, spaced sidewalls 15 and 17 normal  
15 thereto, and a series of spaced separator walls 16 to define each cartridge slot 19 within the  
16 confines of the module. One cartridge slot 19 receives and retains one cartridge 22. The series  
17 of solenoids 23 are seen in part in the view as well. The front wall is open, but for the top and  
18 bottom walls each of which has elongated recesses aligned to receive separator walls 16.

19 In this FIGURE 3, the front wall of a cartridge is 66 while the chamber for storage is  
20 designated 68, The balance of the construction of the cartridge will be discussed supra.

21 In FIGURE 4, a rear perspective view of the module of this invention, there is again  
22 seen the top wall 11, the back wall 18 attached by small screws 26. This back wall 18 extends  
23 downwardly but does not fully enclose the module at the rear thereof. The rear wall extends  
24 downwardly from the top to a point short of interfering with the operation of the latch  
25 disposed there beneath.

26 An inverted L-shaped mounting shelf 21 is secured to the back wall by small screws  
27 not visible in this FIGURE, but which can be seen in FIGURE 9. To which reference can be  
28 simultaneously made. Since there are five cartridges, 5 solenoids 23 are seen linearly aligned.  
29 Each solenoid includes an energizing terminal 24 to which is attached a pair of wires 39 and  
30 a conventional connector 41. The ram housing 30 is secured into an opening 28 in solenoid  
31 mount 21 by a large screw 25. Bottom plate 37 which could be a circuit board for optional  
32 features, is also attached by small screw 26 not seen. The module is spaced from the floor by  
33 a series of self adhesive attached rubber feet 38, seen better in FIGURE 6.

1 A series of five pivot blocks 29 are spaced from each other and affixed to the bottom  
2 wall 37. Each pivot block includes a latch spring, 31, to be described further supra, which  
3 respective spring is retained in place by a large screw 25 that is engaged into an unseen  
4 threaded opening in the respective pivot block. The pivot blocks are each attached to the  
5 bottom wall 37 by a pivot block mount screw 35.

6 The discussion moves now to FIGURE 5 which should be viewed in conjunction with  
7 FIGURE 9. In FIGURE 5 the individual module 10 is seen. Each of the dividers 16 that form  
8 a slot 19 for a cartridge 22, are retained in a channel 20 in the top and bottom walls. A stop  
9 45, which serves to also align the individual cartridge 22 is centrally disposed at the front end  
10 of each slot 19.

11 Upon looking inwardly into an individual chamber 19, and by also referring to  
12 FIGURE 9, one can discern the tilted portion of the latch 33, at the bottom of the chamber,  
13 as well as one of the two bolts 48 and its nut 49 that hold the ejection spring 47 of that  
14 particular chamber in its place. The second such bolt and nut are not visible in FIGURE 5 due  
15 to their placement, but see FIGURE 9 instead.

16 FIGURE 6 is a bottom slightly perspective view of the module of this invention. Here  
17 it can be seen that lower bottom plate 37, which overlies bottom wall 13 is attached by small  
18 screws 26, which screws could also be recessed in the manner shown for screws 26 that retain  
19 the bottom wall 13, if the rear or lower bottom plate were thicker rather than being made of  
20 circuit board material. The series of spaced rubber feet 38 which are preferably employed to  
21 raise the module up and to provide clearance for large screws 25 are readily seen. These large  
22 screws 25, are preferably used with a lock washer 51 to retain the respective pivot block in  
23 position. The wiring shown here has already been briefly described.

24 FIGURE 7 is divided into two sections, FIGURE 7A, which shows the rear and bottom  
25 of a cartridge while FIGURE 7B is of the front and top of a cartridge 22. Pen 60 which forms  
26 no part of this invention is shown for size information only. These cartridges may be clear,  
27 translucent or opaque as may be desired. They are formed of two mirror image U-shaped,  
28 preferably plastic sections 64, 65 which may be attached to each other as by adhesive or small  
29 screws as is desired. The U-shape is seen from the top, per FIGURE 8. Each cartridge features  
30 an open top wall 68, a recessed guide space 67, which is at the bottom, a rear wall 62 and a  
31 front wall 66. A recess zone 63 adapted to receive the latch is found at the rear beneath the  
32 metal strip 67 which is retained by adhesive on said rear wall 62. Optional chip 70 or  
33 microcircuit 70 can be employed for individual cartridge identification as may be desired

1 using techniques known to the art. Designator 69 is the open portion of the rear wall beneath  
2 and below the metal strip 61, that together with the recess zone 63 defines a latch receiver.

3 In FIGURE 8, a more perspective view of a single cartridge is seen. Here, one can  
4 better view the guide space or raceway 67 and its adjacent recess zone 63. Each cartridge may  
5 vary from ½" to about 1" wide and from about 2" to 4" in length.

6 In FIGURE 9, the relative positioning of the pivot block 29, the pivot pin 34 from  
7 which the latch 33 pivots and the ram 27 which emanates from the solenoid 23 upon the  
8 energization thereof are readily seen. Latch spring 31 keeps the latch horizontal until  
9 impacted by the moving ram 27 whose force overcomes the spring's retention force, and thus  
10 moves the latch to the down position as shown in this view. Housing is seen with one  
11 cartridge having been unlatched from latch 33, and having been urged forwardly by spring 47  
12 is seen partly out of the housing 12.

13 As noted earlier screw 25 retains the solenoid housing in the mount shelf 21. The guide  
14 space 67 receives the alignment guide 45 shown elsewhere in the drawings.

15 When the latch is released from beneath the down hanging metal strip the compressed  
16 ejection spring 47 urges the cartridge 22 forward to the position shown in this view. The latch  
17 spring returns the latch to the first upright position. See arrow 74. Note the position of the  
18 stop 45 which both guides the cartridge and prevents rearward insertion past a certain point  
19 upon return to the module.

20 From an operation perspective, when the accession also known as an actuating means  
21 or the computer electronically connected to the accession means, determines which cartridge  
22 is to be released from its module, a signal energizes the solenoid. The solenoid plunger  
23 momentarily pushes down the latch, and releases the latch from engagement with the  
24 cartridge. The cartridge is urged forward by the tension on a leaf spring disposed behind the  
25 cartridge. The ejection spring being tensed, relaxes by urging the cartridge forward far enough  
26 out of the holder for the user to grasp and remove the cartridge from the slot of the cartridge  
27 holder.

28 After the key, coins, stamps or other small item(s) is removed from the chamber of the  
29 cartridge, it is urged back into its slot. The ejection spring 47 is compressed downwardly, and  
30 the metal strip re-engages the latch.

31 When the solenoid is de-energized, the plunger returns inwardly, and the latch spring  
32 then relaxes. Since the plunger has returned to its at rest position, the latch returns to the  
33 upward at rest position.

1 When the cartridge, with the contents now removed, is reinserted into the holder, the  
2 curved lower rear corner of the cartridge upon insertion rides the latch pawl down, such that  
3 the pawl tip will be reinserted into the recess at the base of the cartridge whereby the cartridge  
4 is retained in its respective slot for ultimate restocking prior to its next use. Though of course,  
5 the contents could be used and replaced immediately into the cartridge prior to reinsertion of  
6 the cartridge into the module. An example of such would be the accession to a key to open a  
7 strong box. FIGURE 10 illustrates the procedure to be followed during the course of the use  
8 of the dispenser of this invention. A user with a specific secure mode of access such as but not  
9 limited to the modes shown in box 221, utilizes the mode to send an electronic signal to a  
10 cartridge selector which is basically a computer to send a signal to release a specific selected  
11 cartridge, per box 223.

12 The cartridge is released for removal per box 225. The cartridge is released in a  
13 manner as is discussed elsewhere herein with respect to the discussion of FIGURE 9. The user  
14 removes the small item contents of the cartridge, per box 227, and replaces the cartridge into  
15 its housing, box 229. An optional light or other indicia can signal the previous accession of  
16 the cartridge 231. The contents are now in the hands of the user, per box 233.

17 The logic to specifically select an individual cartridge or a next available cartridge are  
18 both within the skill of the art. Thus, two types of logic are within the scope of this invention.  
19 First, to sequentially select the next available filled cartridge within a module, when all of the  
20 cartridges contain like filling material, such as a key to a room, a debit card for a photocopier,  
21 etc. No true selectivity is defined. The analogy is to the taking of the next candy bar of the  
22 same variety as the previous candy bar.

23 The other type of logic is to permit one to specifically select one special cartridge  
24 within a module because it may have content that differs from the content of the next adjacent  
25 cartridge.

26 As shown in FIGURES 1 and 2, light-emitting diodes or LCD displays can be placed  
27 on the faceplate and wired into the circuitry according to techniques known in the art. These  
28 indicator means can be electronically connected to be lit up when contents are present and  
29 dimmed upon content being removed. Such programmable logic is within the skill of the art.

30 It is also within the scope of the invention to program the logic such that a 10 key  
31 keypad or other alphanumeric pad can specifically select a certain cartridge such as A4 or B5,  
32 similar to the nomenclature shown on the faceplate currently. Such alphanumeric pads are  
33 known in the art and are used today on stamp vending machines and certain large selection



1 snack food vending machines. Thus further details on how to incorporate such technology into  
2 the access point need not be provided.

3 One item not discussed previously fully is faceplate, 101. This plate is the same as the  
4 front wall 101 shown in FIGURE 1. The dashed lines, unnumbered thereon, are an indicator  
5 of the bolt holes shown in FIGURE 1 for mounting the plate.

6 In the storage cabinet of FIGURE 2, it is seen that the cabinet includes a plurality of  
7 boxes, each of which has a row of modules each of which contains a plurality of cartridges.  
8 These cartridges are released from their respective holders by the utilization of any of the  
9 means shown in FIGURE 11. All of these accession means offer a secure controlled access  
10 to either the storage cabinet in general whereby the computer determines which cartridge is  
11 to be released, or the accession means, be it code or mode, can be the manner in which the  
12 specifically determined which cartridge is to be released. If the accession means is located  
13 at the site of the cartridges, then the accession means can more easily specifically determine  
14 which cartridge is to be released from its module. All such permutations are well within the  
15 skill of today's computer programmer.

16 Reference is made once again to FIGURE 2 to viewed in conjunction with FIGURE  
17 11. Here in FIGURE 11 it is seen that keypad 126 and the other controlled access modes such  
18 as the coin and bill receivers shown in FIGURE 2, and access modes connected electronically  
19 such as computer keypad 131 and telephone keypad 132 all access the storage cabinet  
20 depicted as box 120 for release of a cartridge and its contents.

1           It is seen that I have provided a safe and secure system for the accession of small items  
2 that require secure confinement, the retrieval of which can be accomplished by various  
3 procedures. Such items include keys, messages, coins, and the like.

4           Since certain changes may be made in the above described product without departing  
5 from the scope of the invention herein involved, and certain changes can also be made in the  
6 procedural steps of the process disclosed herein, without departing from the scope of the  
7 invention, it is intended that all matter contained in the above description and shown in the  
8 accompanying drawings shall be interpreted as illustrative and not in a limiting sense.